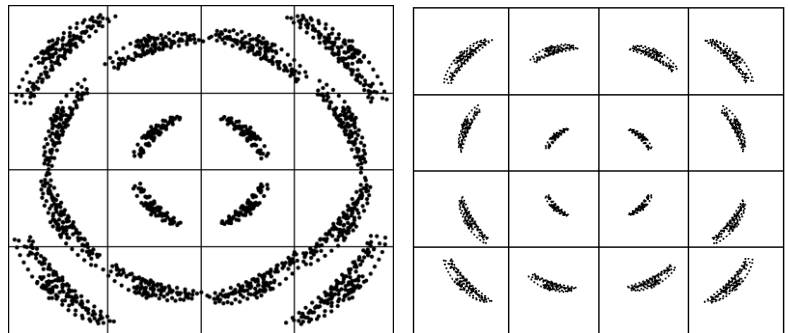


## Qualifying LO Substitution Phase Noise Improvements

Today's communication systems (e.g., 5G and Wi-Fi) utilize high order modulation to achieve high data throughput. Higher throughput requires faster clock rates, which can increase symbol errors. A potential source of these errors is phase noise from the existing local oscillator (LO).



A low phase noise synthesizer signal can be used as an LO substitute to see if a reduction in symbol errors is possible.

*16 QAM with a poor phase noise LO*

*16 QAM with a low phase noise LO*

Using a high-performance phase noise analyzer, engineers can measure the phase noise improvement directly to find a suitable replacement LO.

This demonstration highlights the capabilities of the Maury Microwave HSX9000A series of multi-channel RF synthesizers with the ULN ultra-low phase noise option as an ideal LO substitute, as well as the Maury Microwave HA7062 series for real-time phase noise measurements.

### Demo Setup



### Target Users

Target users include design engineers and technicians engaged in design, verification, and troubleshooting of RF and microwave communication systems.

## Product Overview

### HSX9000A Series Multi-Channel RF Synthesizers

The HSX Series RF synthesizers of the Holzworth product line offer industry-leading phase noise and spectral purity as a multi-channel CW signal source. The compact 1U chassis allows up to 4 independently tunable channels (frequency / phase offset / amplitude) to optimize channel density within test system racks with limited space. Application-specific frequency options can be configured to cover combinations of 10 MHz to 3 GHz, 6 GHz, 12 GHz, 20 GHz, and 40 GHz. Each channel output provides accurate power levels from -110 dBm up to +18 dBm. Its unique multi-loop architecture provides the ultimate in frequency accuracy, channel-to-channel stability, and phase coherency.

#### KEY SPECIFICATIONS AND FEATURES:

- Up to 4 independently controlled phase coherent channels
- Ultra-low phase noise (ULN) option available
- Mix or match 3, 6, 12, 20, and 40 GHz channels
- 40 GHz phase noise: -115 dBc/Hz 10 kHz offset (low close-in phase noise option)
- Compact 1U form factor
- +18 dBm to -110 dBm

### HA7062C and HA7062D Real-Time Phase Noise Analyzers

The Holzworth product line real-time phase noise analyzers (HA7062C and HA7062D) offer a unique combination of accuracy, speed, flexibility, and reliability in a compact form factor. Control is easy through an intuitive GUI or simple remote commands. This makes them ideal for use in the lab and production.

#### KEY SPECIFICATIONS AND FEATURES:

- DUT input: 10 MHz to 6 GHz, 26 GHz, opt 40 GHz
- Measurement bandwidth: 0.1 Hz to 100 MHz
- Automated absolute and additive (residual) measurements
- Only analyzer available that allows actual noise floor measurements
- Real-time cross correlation
- Extremely fast measurement speeds

## More Resources

Visit [info.maurymw.com/ims-2024](https://info.maurymw.com/ims-2024) to learn more about Maury Microwave solutions.

